REMARKS

Overview of the Office Action

Claims 1, 3, 5, 6, 8-16 and 21-24 have been rejected under 35 U.S.C. §102(e) as being anticipated U.S. Patent No. 6,703,780 ("Shiang").

Status of the claims

Claims 2, 4, 7, and 17-20 have been previously canceled.

Claims 3, 5, 6, 8-16, and 21-24 have now been canceled.

Claim 1 has been amended.

Claims 25-35 have been newly added.

Claims 1 and 25-35 are now pending.

Rejection of claims 1, 3, 5, 6, 8-16 and 21-24 under 35 U.S.C. § 102(e)

The Office Action states that Shiang discloses all of Applicants' recited elements.

Independent claim 1 has been amended to recite a high power conversion LED that includes "one LED for emitting a primary radiation, the LED comprising a semiconductor material selected from the group consisting of GaInN, GaN, and a combination thereof; and one luminescence conversion body for converting the primary radiation into a secondary radiation, wherein the luminescence conversion body is a polycrystalline ceramic body sintered together from individual base crystallites that are formed by a base material that is doped by a dopant such that the polycrystalline ceramic body acts partly or completely as luminescent material by virtue of at least part of the base material being activated by said dopant, wherein the ceramic body has a ceramic density of above 90% so that the ceramic body is translucent to both the

primary radiation and the secondary radiation, and wherein said ceramic body is larger than the LED, and the ceramic body and the LED are disposed directly on one another or are connected together by an adhesive". Support for the claim amendment can be found in Figs. 1-3 paragraphs [0042], [0046], and original claim 7 of Applicants' published specification.

Shiang fails to teach or suggest a high power conversion LED "wherein said ceramic body is larger than the LED, and the ceramic body and the LED are disposed directly on one another or are connected together by an adhesive", as recited in Applicants' amended claim 1.

On page 2 of the Office Action the Examiner states that the OLED of Shiang teaches Applicants' light source that comprises at least one light emitting diode. Applicants submit that an Organic Light Emitting Device (OLED) is not the same device as a Light Emitting Diode (LED).

Applicants acknowledge that an OLED is sometimes referred to as an organic light emitting diode. However, an OLED device is not a diode. Rather an OLED is an area illuminator that includes one or more organic light emitting layers (which is not a diode) disposed between two electrodes (e.g., a cathode and a light transmissive anode), formed on a light transmissive substrate (see, e.g., Fig. 4 of Shiang). The organic light emitting layer emits light upon application of a voltage across the anode and cathode. Upon the application of a voltage from a voltage source, electrons are directly injected into the organic layer from the cathode, and holes are directly injected into the organic layer from the anode. The electrons and the holes travel through the organic layer until they recombine to form excited molecules or excitons. The excited molecules or excitons emit light when they decay. Further, the external quantum efficiency of OLEDs, which is defined as a ratio of the photons emitted by the device to the number of injected electrons is lower than desired (see col. 1, lines 8-28 of Shiang).

On the other hand, a Light Emitting Diode (LED) is itself a diode and is a point-like radiator that consists of a chip of inorganic semiconducting material impregnated, or doped, with impurities to create a p-n junction. Charge-carriers (i.e., electrons and electron holes) flow into the junction from electrodes with different voltages. When an electron meets a hole, it falls into a lower energy level, and releases energy in the form of a photon.

Moreover, OLEDs typically emit less light per area than inorganic solid-state based LEDs, which are usually designed for use as point light sources. Hence, it is clear that an OLED is not the same device as an LED, and thus cannot be automatically substitued for an LED. Therefore, Shiang fails to teach or suggest a conversion LED, as recited in Applicants' claim 1.

As a consequence of the above described differences, it is difficult to obtain homogeneous emitted light from a conversion LED, but not from an OLED. Further, an LED is capable of achieving a high power density, while an OLED cannot.

In conversion LEDs, with high power thermal problems, thermal quenching of the phosphor occurs. This means the phosphor grains become very hot. This never arises in OLEDs because there are no grains and no high power. Additionally, thermal conductivity of ceramic is very high. This means that heat can be quickly distributed within the ceramic body and then to the environment. Conventional LEDs use materials such as silicone, for example. These materials have low thermal conductivity. The use of ceramic in LEDs avoids thermal quenching. Consequently, using ceramic for the body as illustrated in Applicants' Figs. 1-3 allows the body bet in direct contact with the LED and to be larger than the substrate of the LED (see also paragraphs [0045] and [0046] of Applicants' specification). A larger body distributes heat better than a smaller body.

However, according to Fig. 4 and col. 8, lines 30-33 of Shiang, "the organic light

emitting device 100 includes an organic light emitting layer 110 disposed between two electrodes, e.g., a cathode 120 and an anode 130". In other words, there no direct contact between the organic light emitting layers and the ceramic layer in the device of Shiang.

Therefore, Shiang clearly fails to teach or suggest a high power conversion LED "wherein said ceramic body is larger than the LED, and the ceramic body and the LED are disposed directly on one another or are connected together by an adhesive", as recited in Applicants' amended claim 1.

In view of the foregoing, Applicants submit that Shiang fails teach or suggest the subject matter recited in independent claim 1. Accordingly, claim 1 is patentable over Shiang under 35 U.S.C. §102(e).

Dependent claims

Claims 3, 5, 6, 8-16 and 21-24 have been canceled.

Newly added claims 25-35

Claims 25-35 have been newly added. Support for claim 25 can be found in original claims 1, 12, 13, and 14. Support for claim 26 can be found in original claims 1, 12, and 16. Support for claims 27-30 can be found in original claims 6 and 24, and paragraph [0050] and Fig. 5 of Applicants' specification. Support for claim 31 can be found in paragraph [0049] and Fig. 4 of Applicants' specification. Support for claims 32-34 can be found in original claim 11 and paragraph [0049] of Applicants' specification. Support for claim 35 can be found paragraph [0052] and Fig. 8 of Applicants specification.

New independent claim 25 recites the limitation "wherein the ceramic body comprises at least one optical element for influencing a beam path of the primary radiation and a beam path of the secondary radiation, and wherein the optical element is disposed at one surface section of the ceramic body, said surface section being formed as a lens".

One problem with LEDs is extracting light from them because they are point light sources. This problem is typically solved by using a lens array or similar optical device. However, Applicants' recited invention uses a lens that is an inherent feature of the ceramic body (see Figs. 6 and 7 of Applicants' specification).

In contrast, an OLED does not require such an optical device because an OLED is not a point light source and is instead an area light source, as described in detail above. Shiang fails to teach or suggest "wherein the ceramic body comprises at least one optical element for influencing a beam path of the primary radiation and a beam path of the secondary radiation, and wherein the optical element is disposed at one surface section of the ceramic body, said surface section being formed as a lens", as recited in Applicants' claim 25.

In view of the foregoing, Applicants submit that Shiang fails teach or suggest the subject matter recited in independent claim 25. Accordingly, claim 25 is patentable over Shiang under 35 U.S.C. §102(e).

New independent claim 26 recites the limitation "wherein the ceramic body comprises at least one optical element for influencing a beam path of the primary radiation and a beam path of the secondary radiation, said optical element being formed from a plurality of scattering centers, the scattering centers comprising impurity crystallites selected from the group consisting of aluminum oxide, titanium oxide, yttrium aluminum garnet (YAG), yttrium oxide, and combinations thereof within the ceramic body".

Shiang discloses using voids for scattering light radiated from the OLED (see col. 7, line 21 of Shiang). However, voids cannot be effectively controlled. Consequently, Applicants' recited invention effects scattering through the use of impurity crystallites within the ceramic body, which are contrary to voids, and which Shiang fails to teach or suggest.

In view of the foregoing, Applicants submit that Shiang fails teach or suggest the subject matter recited in independent claim 26. Accordingly, claim 26 is patentable over Shiang under 35 U.S.C. §102(e).

Claims 27-30, which depend from independent claim 26, incorporate all of the limitations of independent claim 26 and are, therefore, deemed to be patentably distinct over Shiang for at least those reasons discussed above with respect to independent claim 26.

New independent claim 31 recites the limitation "wherein the ceramic body comprises a carrier, which only includes base crystallites and a layer, which is activated by a dopant". Shiang fails to teach or suggest this limitation.

In view of the foregoing, Applicants submit that Shiang fails teach or suggest the subject matter recited in independent claim 31. Accordingly, claim 31 is patentable over Shiang under 35 U.S.C. §102(e).

Claims 32-34, which depend from independent claim 31, incorporate all of the limitations of independent claim 31 and are, therefore, deemed to be patentably distinct over Shiang for at least those reasons discussed above with respect to independent claim 31.

New independent claim 35 recites a conversion LED, that includes "at least one LED for emitting a primary radiation; and at least one luminescence conversion body for converting the primary radiation into a secondary radiation, wherein the luminescence conversion body is a ceramic body sintered together from individual base crystallites that are formed by a base

material that is doped by a dopant such that the ceramic body acts partly as luminescent material by virtue of at least part of the base material being activated by the dopant, and wherein the LED and the luminescence conversion body are an integral body, the integral body comprises one or two arms and a stub, with at least one arm serving as a radiation generator for the LED and the stub providing a doped layer which is activated by the dopant, and the primary radiation is guided into the stub".

Shiang fails to teach or suggest, at least, "wherein the LED and the luminescence conversion body are an integral body, the integral body comprises one or two arms and a stub, with at least one arm serving as a radiation generator for the LED and the stub providing a doped layer which is activated by the dopant, and the primary radiation is guided into the stub".

In view of the foregoing, Applicants submit that Shiang fails teach or suggest the subject matter recited in independent claim 35. Accordingly, claim 35 is patentable over Shiang under 35 U.S.C. §102(e).

Conclusion

In view of the foregoing, reconsideration and withdrawal of all rejections, and allowance of all pending claims, are respectfully solicited.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned

Respectfully submitted,

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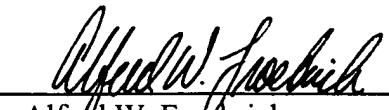
By 

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